

**POLYUNSATURATED FATTY ACIDS IN PLANTS****ABSTRACT**

The present invention relates to compositions and methods for preparing  
5 polyunsaturated long chain fatty acids in plants, plant parts and plant cells, such as leaves,  
roots, fruits and seeds. Nucleic acid sequences and constructs encoding fatty acid desaturases,  
including  $\Delta 5$ -desaturases,  $\Delta 6$ -desaturases and  $\Delta 12$ -desaturases, are used to generate transgenic  
plants, plant parts and cells which contain and express one or more transgenes encoding one  
or more desaturases. Expression of the desaturases with different substrate specificities in the  
10 plant system permit the large scale production of polyunsaturated long chain fatty acids such  
as docosahexaenoic acid, eicosapentaenoic acid,  $\alpha$ -linolenic acid, gamma-linolenic acid,  
arachidonic acid and the like for modification of the fatty acid profile of plants, plant parts and  
tissues. Manipulation of the fatty acid profiles allows for the production of commercial  
quantities of novel plant oils and products.